

MOUNTING ARRANGEMENT FOR THE INTERNAL DIVIDING MEANS  
IN REFRIGERATORS AND FREEZERS

Field of the Invention

The present invention refers to a constructive  
5 arrangement for mounting dividing means, such as  
shelves, compartments, and other accessories, in  
different positionings inside the cabinet of a  
refrigerator or freezer, after the formation of said  
10 cabinet still in the manufacturing phase of the  
refrigeration appliance, or even after the latter has  
been acquired by the user.

Prior Art

There are well known the refrigerators and freezers  
comprising a simple or combined cabinet which is made  
15 of a generally metallic external box, and an internal  
box defining a respective refrigeration compartment,  
usually molded in plastic material and which is  
maintained affixed within the external box, with a  
layer of thermal insulating material, which is  
20 normally defined in polyurethane foam and provided  
between said internal and external boxes.

In these known constructions, each internal box of the  
cabinet is molded so as to have its lateral walls  
configured to provide means that define support  
25 members for the seating or fitting of different  
accessories to be positioned inside the cabinet, such  
as shelves, compartments, etc.

Thus, the manufacture of the internal boxes presently  
known is made according to the project of the internal  
30 arrangement of the accessories for each line of  
refrigeration appliance, compulsorily requiring the  
provision of different designs and, consequently, of  
different molds for the injection of the internal  
boxes, each being structurally configured to make the  
35 support members compatible with the project of the

refrigerator or freezer.

Besides the project inflexibility imposed by the present systems, these known constructions require the internal arrangement of the accessories to be defined 5 by the manufacturer himself, according to the project of each refrigerator or freezer, making impossible to modify, during manufacture, commerce or use of the appliance by the end user, the arrangement of the shelves or internal compartments, according to the 10 usage particularities of the refrigerator or freezer.

The attempts made to provide more versatile arrangements for the fixation of the support means, which at least allow modifying the internal positioning of such elements during manufacture of the 15 refrigerator or freezer, have resulted in systems which require pieces of complex and costly construction to be adapted to the internal structure of the cabinet, through difficult operations which require special mounting tools.

20 Objects of the Invention

Considering the deficiencies mentioned above for the presently known mounting arrangements, it is a generic object of the present invention to provide a new mounting arrangement for the internal dividing means 25 in refrigerators and freezers, which allows the definition and the simple, quick, and relatively inexpensive formation of the elements for the fixation of several support means in the interior of the cabinet, immediately after the manufacture of the 30 latter or even after the refrigeration appliance is made available for sale or in use by the end user.

It is a complementary object of the present invention to provide a mounting arrangement of the type mentioned above, which allows the production of a 35 single internal box for a determined dimensional

design of a refrigeration cabinet, independently of the internal arrangement of the support members to be affixed for supporting the shelves, compartments and other internal dividing means.

5    Summary of the Invention

In order to comply with the above-mentioned objects of the invention, the present arrangement comprises: at least two holes, horizontally spaced from each other and which are produced through a respective lateral wall of the internal box and through part of the thickness of the adjacent portion of the thermal insulator; a tubular bushing which is tightly fitted in each of said holes; and at least one support member, which is configured to support, laterally, an internal dividing means of the cabinet, and to incorporate at least one pin to be fitted and axially removably retained in each of said tubular bushings, securing the support means against a respective lateral wall of the internal box at a height which is defined upon the provision of the respective holes in the already formed cabinet.

Brief Description of the Drawings

The invention will be described below, with reference to the enclosed drawings, given by way of example of 25 an embodiment of the invention and in which:

Figure 1 is a front perspective view of a combined refrigerator cabinet, whose internal box carries, on one of its lateral walls, two already mounted support members and several sets of tubular bushings already 30 fitted in the respective holes of the cabinet;

Figure 2 is an enlarged vertical sectional view of a wall portion of the cabinet of figure 1, illustrating a tubular bushing fitted into a respective hole provided in the cabinet;

35    Figure 3 is a cross-sectional view of the support

member in the form of a rail illustrated in figure 1 and incorporating a pair of pins to be fitted in respective tubular bushings;

Figure 4 is a view similar to that of figure 2, but  
5 with the tubular bushing securing a respective pin of the support member illustrated in figure 3;

Figure 5 is a perspective view of the support member illustrated in the upper part of the internal box in figure 1, incorporating a pair of mounting pins; and  
10 Figure 6 is a perspective view of the support member illustrated in figures 1, 3 and 4.

Description of the Invention

As previously mentioned and as illustrated in the enclosed drawings, the present mounting arrangement is directed to refrigerators and freezers having a simple or combined cabinet 10, consisting of a generally metallic plate external box 11, and at least one internal box 12, generally injected in plastic material and which is made in a single piece with a substantially parallelepipedic shape, defining a respective refrigeration compartment C. Between the internal box 12 and the external box 11, a thermal insulator 13, generally in polyurethane foam, is injected. The refrigeration compartment C is limited, on both sides, by lateral walls 14, only one being illustrated in figure 1.

According to the present invention, the mounting arrangement comprises, initially, the provision of at least two holes 15, horizontally spaced from each other and which are produced through a respective lateral wall 14 of the internal box 12 and through part of the thickness of the adjacent portion of the thermal insulator 13. In the construction illustrated in figure 1, each lateral wall 14 of the internal box 12 is provided with a plurality of pairs of holes 15,

horizontally spaced from each other and which are positioned in different levels along the useful height of said lateral walls 14, the positioning of said holes 15 being defined as a function of the mounting  
5 possibilities of support members for shelves and compartments to be described below. Thus, depending on the number and the position of the internal dividing means to be provided in the interior of the cabinet 10, the latter, after the assembly of both the  
10 external box 11 and the internal box 12 and after the injection of the thermal insulator 13, is submitted to a perforating step, in which the lateral walls 14 receive the pairs of holes which are designed to match the requirements for the assembly of the internal  
15 dividing means, as a function of the different models of refrigerator or freezer to be produced from the same internal box that is molded in a single type of mold.

In each hole 15 is tightly fitted a tubular bushing  
20, preferably constructed in plastic material and which comprises a front end portion 21, opened to the inside of the cabinet 10, and a median portion 22 and a rear end portion 23 which are positioned in the interior of the thermal insulator 13. The rear end  
25 portion 23 presents, internally, a diametrical widening 23a in relation to the adjacent region of the median portion 22. In the illustrated embodiment, the interior of the median portion 22 of the tubular bushing 20 is slightly frusto-conical, widening  
30 towards the front end portion 21, the latter generally incorporating, externally, a peripheral flange 21a to be seated against the lateral wall 14 of the cabinet 10.

Aiming at better axially retaining the tubular bushing  
35 20 in the interior of the hole 15, the front end

portion 21 of each tubular bushing 20 presents, externally, close to the peripheral flange 21a, a frusto-conical portion 21b, tapering towards the peripheral flange 21a and which has a longitudinal extension slightly larger than the thickness of the internal box 12, said frusto-conical portion 21b having its larger diameter slightly larger than the diameter of the respective hole 15 passing through the internal box 12. With this construction, after the introduction of the tubular bushing 20 inside the hole 15, said frusto-conical portion 21b of the tubular bushing 20 is positioned exactly in the region of the hole 15 defined along the thickness of the internal box 12, making the external conical shape of this portion of the tubular bushing 20 to be axially retained against the wall of the internal box 12.

In order to improve the resistance of the tubular bushing 20, its rear end portion 23 is closed immediately after the diametrical widening 23a, making the radial stresses, to which the bushing will be submitted during operation, to be supported by the closing of its rear end portion 23.

In each tubular bushing 20 there is tightly fitted and axially retained a pin 30 incorporated to a support member 40, 50 which is configured to support, laterally, an internal dividing means of the cabinet 10, which internal dividing means can present the form of a shelf, of a sliding compartment, or any other accessory to be laterally supported inside the refrigeration compartment C, by seating on the lateral walls 14 of the cabinet 10. The dimensioning of the pin 30 is made so that it can be adequately retained inside a respective tubular bushing 20, but also easily liberated from the lateral wall 14 of the cabinet 10, in order to allow the replacement of the

- support members 40, 50 or the modification of their positioning for the different bushings which are previously fitted in different levels in the lateral walls 14 of the cabinet 10.
- 5 The support means 40, 50 can present different constructions, such as, for example, in the form of a rail laterally incorporating a pair of pins 30 to be fitted in respective tubular bushings 20 affixed to each lateral wall 14 of the cabinet 10, said support member 40 being configured to support, slidably, a lateral edge of an internal dividing means of the cabinet 10, which dividing means, as already mentioned, can be defined as a simple shelf, or a compartment, or even a sliding tray.
- 10 15 The support member 40, 50 in the form of a rail can present a simple rectilinear construction to be horizontally secured to a respective lateral wall 14 of the cabinet 10, or take the form of complex rails, such as that illustrated in figure 5 and which allows
- 20 25 the internal dividing means mounted thereto to be displaced between the different operative positions, spaced from each other at least on the vertical direction. The support member 40 mentioned above is better illustrated in figure 6.
- 30 35 According to the preferred embodiment illustrated in the drawings, each pin 30 of a support member 40, 50 presents a tubular cross section, having an external contour which is similar to and slightly smaller than that of the internal cross section of the tubular bushing 20, and a free end portion 33, resiliently deformable in the radial direction and which is tightly fitted in the interior of the diametrical widening 23a of the respective tubular bushing 20, so as to axially lock the pin 30 inside the tubular bushing 20. In order to facilitate the elastic

deformation of the pin 30 during the operations of fitting it into and removing it from the tubular sleeve, the free end portion 33 of the pin 30 is longitudinally split in at least one position.

- 5 While only one embodiment of the invention has been illustrated herein, it should be understood that changes in the form and relative arrangement of the elements could be made, without departing from the constructive concept defined in the appended claims.